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FAX TRANSMISSION February 22, 2007

TO: Office of Initial Patent Examination  
Customer Service Center  
Assistant Commissioner for Patents  
PO Box 1450  
Alexandria, VA 22313-1450

FROM: Douglas P. Mueller

OUR REF: 10873.1885USWO

TELEPHONE: (612) 455.3800

Total pages, including cover letter: 12

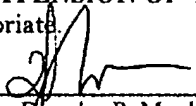
PTO FAX NUMBER: 571.273.8300

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Title of Documents: **Request for Corrected Filing Receipt**  
**Marked Copy of Filing Receipt**  
**Copy of International Preliminary Report on Patentability**

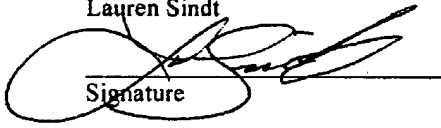
Applicant: OKUBO et al.  
Serial No.: 10/576369  
App. Filed: April 19, 2006

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By:   
Name: Douglas P. Mueller  
Reg. No.: 30,300

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S/N 10/576369

PATENTIN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: OKUBO et al. Serial No.: 10/576369  
Filed: April 19, 2006 Docket No.: 10873.1885USWO  
Title: METHOD AND APPARATUS FOR TREATING EXHAUST GAS

CERTIFICATE UNDER 37 CFR 1.6(d):

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By: 

Name: Lauren Sindt

REQUEST FOR CORRECTED FILING RECEIPT

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Customer Service Center  
Assistant Commissioner for Patents  
Alexandria, VA 22313-1450

Dear Sir:

Enclosed is a copy of the filing receipt from the United States Patent and Trademark Office in the above-identified application showing requested corrections.

The Assignment information does not appear on the Filing Receipt. Please add Osaka Industrial Promotion Organization, Osaka, JAPAN.

Correction of the records of the United States Patent and Trademark Office and issuance of a corrected filing receipt are respectfully solicited.

Respectfully submitted,

**52835**

PATENT TRADEMARK OFFICE

Dated: February 22, 2007

HAMRE, SCHUMANN, MUELLER &  
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## UNITED STATES PATENT AND TRADEMARK OFFICE

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APPL. NO.	FILING OR 371 (c) DATE	ART UNIT	FILE REC'D	ATTY. DOCKET NO	DRAWINGS	TOT CLMS	IND CLMS
10/576,369	04/19/2006	1754	1260	10873.1885USWO	10	19	2

CONFIRMATION NO. 9444

52835  
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## FILING RECEIPT



\*OC000000021673761\*

Date Mailed: 12/26/2006

Receipt is acknowledged of this regular Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please mail to the Commissioner for Patents P.O. Box 1450 Alexandria Va 22313-1450. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).

## Applicant(s)

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Assignment for Published Patent Application  
Osaka Industrial Promotion Organization, Osaka, JAPAN

Power of Attorney: The patent practitioners associated with Customer Number 52835.

## Domestic Priority data as claimed by applicant

This application is a 371 of PCT/JP04/14737 10/06/2004

## Foreign Applications

JAPAN 2003-381010 10/21/2003

If Required, Foreign Filing License Granted: 12/19/2006

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US10/576,369**

Projected Publication Date: 03/29/2007

Non-Publication Request: No

Early Publication Request: No

D

FEB 22 2007

Page 2 of 3

## Title

Method and apparatus for treating exhaust gas

## Preliminary Class

423

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Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process simplifies the filing of patent applications on the same invention in member countries, but does not result in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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# TRANSLATION PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference <b>H2206-01</b>	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. <b>PCT/JP2004/014737</b>	International filing date (day/month/year) <b>06.10.2004</b>	Priority date (day/month/year) <b>21.10.2003</b>	
International Patent Classification (IPC) or national classification and IPC <b>B01D53/60, B01D53/44, B01D53/62, B01D53/70, B01D53/72, F01N3/08</b>			
Applicant <b>OSAKA INDUSTRIAL PROMOTION ORGANIZATION</b>			

1.	This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2.	This REPORT consists of a total of <u>7</u> sheets, including this cover sheet.
3.	This report is also accompanied by ANNEXES, comprising: <div style="margin-left: 20px;">           a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>3</u> sheets, as follows:           <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).                <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.             </div>           b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s))         </div>
_____, containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).	
4.	This report contains indications relating to the following items: <div style="margin-left: 20px;"> <input checked="" type="checkbox"/> Box No. I Basis of the report  <input type="checkbox"/> Box No. II Priority  <input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability  <input type="checkbox"/> Box No. IV Lack of unity of invention  <input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement  <input type="checkbox"/> Box No. VI Certain documents cited  <input type="checkbox"/> Box No. VII Certain defects in the international application  <input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application         </div>

Date of submission of the demand	Date of completion of this report
Name and mailing address of the IPEA/IP	Authorized officer
Facsimile No.	Telephone No.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

Box No. I Basis of the report

1. With regard to the language, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

- ☐ This report is based on translations from the original language into the following language \_\_\_\_\_ which is the language of a translation furnished for the purposes of:
- ☐ international search (Rule 12.3 and 23.1(b))
- ☐ publication of the international application (Rule 12.4)
- ☐ international preliminary examination (Rule 55.2 and/or 55.3)

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

- ☐ the international application as originally filed/furnished
- ☒ the description:
- pages 1-14 \_\_\_\_\_ as originally filed/furnished

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

pages\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☒ the claims:
- nos. 3-9, 11-20 \_\_\_\_\_ as originally filed/furnished

nos.\* \_\_\_\_\_ as amended (together with any statement) under Article 19

nos.\* 1, 10 \_\_\_\_\_ received by this Authority on 17.02.2006

nos.\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☒ the drawings:
- sheets fig. 1-15 \_\_\_\_\_ as originally filed/furnished

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

sheets\* \_\_\_\_\_ received by this Authority on \_\_\_\_\_

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

☐ the description, pages \_\_\_\_\_

☒ the claims, nos. 2 \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (specify): \_\_\_\_\_

☐ any table(s) related to sequence listing (specify): \_\_\_\_\_

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).

☐ the description, pages \_\_\_\_\_

☐ the claims, nos. \_\_\_\_\_

☐ the drawings, sheets/figs \_\_\_\_\_

☐ the sequence listing (specify): \_\_\_\_\_

☐ any table(s) related to sequence listing (specify): \_\_\_\_\_

\* If item 4 applies, some or all of those sheets may be marked "superseded."

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

## 1. Statement

Novelty (N)

Claims 1, 3-20

YES

Claims

NO

Inventive step (IS)

Claims

YES

Claims 1, 3-20

NO

Industrial applicability (IA)

Claims 1, 3-20

YES

Claims

NO

## 2. Citations and explanations (Rule 70.7)

Document 1: JP 11-114351 A (Kabushiki Kaisha Sandensha),  
27 April 1999, claims 2, 3, 4, 9, 10 and 11,  
and paragraphs [0002], [0005], [0018],  
[0040], [0043], [0053], [0074] and [0075]

Document 2: JP 2000-170523 A (Institut Francais du  
Petrole), 20 June 2000, paragraphs [0009] to  
[0015]

Document 3: JP 2002-115531 A (Isuzu Ceramics Research  
Institute Co., Ltd.), 19 April 2002,  
paragraphs [0026] and [0027]

Document 4: JP 2003-512167 A (Accentus P. L. C.), 02  
April 2003, paragraph [0002]

Document 5: JP 7-213859 A (Mitsubishi Heavy Industries,  
Ltd.), 15 August 1995, paragraphs [0013] and  
[0014]

The inventions set forth in claims 1, 3, 4, 6, 7,  
10, 11 and 19 do not involve an inventive step in the  
light of document 1 cited in the international search  
report. Document 1 discloses a gas that is used in a  
process for desorbing the component to be treated, a  
process for breaking down the component to be treated and  
a process for regenerating the adsorbent, and indicates



## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

that the oxygen and the nitrogen in the abovementioned gas promote the abovementioned process for breaking down the component to be treated. Such being the case, document 1 can be considered to indicate that the abovementioned gas is a gas that comprises both oxygen and nitrogen. Therein, document 1 also indicates that the component to be treated, which is present within the desorbed gas, is further broken down by means of a separate device.

Meanwhile, the fact that it is undesirable for the gas that is used when desorbing the NO<sub>x</sub> from an adsorbent to have a high oxygen content is well known, as disclosed in document 2 and document 3 cited in the international search report for example. In addition, the process for treating a gas that contains NO<sub>x</sub>, wherein a non-thermal plasma that was generated by means of a plasma reactor is applied to said gas in order to reduce the NO<sub>x</sub> to N<sub>2</sub>, is also well known, as disclosed in newly cited document 4 for example.

Such being the case, it would have been easy for a person skilled in the art to conceive of configuring so that the abovementioned gas in the invention disclosed in document 1 has a high nitrogen content and a low oxygen content; establishing an upper limit for the oxygen content of the gas and a lower limit for the nitrogen content of the gas in order to ensure that the gas has a suitable nitrogen content and a suitable oxygen content; and applying a non-thermal plasma that was generated by means of a plasma reactor to the NO<sub>x</sub>-containing gas that was desorbed from the adsorbent in order to reduce the NO<sub>x</sub> to N<sub>2</sub>.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability;  
citations and explanations supporting such statement

The inventions set forth in claims 5 and 20 do not involve an inventive step in the light of document 1. The technical feature wherein the exhaust gas is used as the gas in the process for desorbing the component to be treated is well known, as disclosed in document 5 cited in the international search report for example.

The inventions set forth in claims 8 and 9 do not involve an inventive step in the light of document 1. The technical feature wherein a non-thermal plasma is applied to the gas by means of one of the methods set forth in claim 8 or a combination of said methods, and the technical feature wherein an additional quantity of the catalyst is added during the process for removing the component to be treated in order to improve the removal efficiency of said process were both well known.

The inventions set forth in claims 12 to 18 do not involve an inventive step in the light of document 1. Configurations wherein it is possible to switch between a plurality of pre-prepared flow paths in order to remove the component to be treated by means of an adsorption process and a desorption process, and configurations wherein the abovementioned switching method is a method that involves switching valves or a method that involves a rotating rotor are both well known. In addition, the technical feature wherein the flow path for subjecting the component to be treated to a desorption process and a detoxification process is a gas circulation path; the technical feature wherein the gas pressure and the gas temperature are changed during the process for adsorbing the component to be treated and the process for desorbing the component to be treated in order to promote the adsorption and the desorption of the component to be

Form PCT/ISA/210 (Rev. No. 10) (January 2004)

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

Box No. V

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability:  
citations and explanations supporting such statement

treated; the technical feature wherein the exhaust gas treatment device is equipped with a gasometer device that has a sensor for detecting the concentration of a prescribed gas in order to control the content of said prescribed gas within a mixed gas; and the technical feature wherein the exhaust gas treatment device is provided with a device for scavenging the aerosols and the fine particles that are present within the exhaust gas are all well known.

## INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/JP2004/014737

## Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

With regards to the "non-thermal plasma of a nitrogen gas," which is set forth in claim 1, paragraph [0019] indicates that "the term 'non-thermal plasma,' as used in the present invention, refers to an ionized plasma with a gas temperature that is significantly lower than the combustion temperature of conventional gasses (i.e. a temperature of approximately 700 to 1000°C), said plasma generally having a temperature of 300°C or lower." Such being the case, the "non-thermal plasma of a nitrogen gas" from claim 1 is thought to be a plasma with a temperature of 300°C or lower, which is substantially lower than a temperature of 700°C.

However, claim 6, which cites claim 1, indicates that the "aforementioned nitrogen gas plasma gas has a temperature of 1000°K or lower." Therein, if the "aforementioned nitrogen gas plasma gas" is referring to the "non-thermal plasma of a nitrogen gas" which is set forth in claim 1, then the specific range of temperatures for the "non-thermal plasma" that is set forth in claims 1 and 6 is unclear.